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# DEFENSE SPENDING:
# WHAT HAS BEEN ACCOMPLISHED

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## PREFACE

This paper has been prepared by the Congressional Budget Office at the request of Senator Lawton Chiles, ranking minority member of the Senate Budget Committee. It presents a summary review of improvements since 1980 in factors contributing to U.S. military capability. In keeping with CBO's mandate to provide objective and nonpartisan analysis, the paper makes no recommendations.

This paper was prepared by R. William Thomas under the general supervision of Robert F. Hale and John D. Mayer, Jr. Eugene Bryton and Jonathan Tyson of CBO's Budget Analysis Division prepared some of the data. Robert Kornfeld was a valued collaborator in compiling and verifying the data presented here. Other members of the National Security Division and Budget Analysis Division also made important contributions to the analysis.

## SUMMARY AND CONCLUSIONS

During the first four years of this Administration (fiscal years 1982-1985), the Congress provided about $1.1 trillion in budget authority for national defense, some 36 percent more in real (inflation-adjusted) terms than was spent in the previous four years. This rate of expansion in defense budget authority was higher than in any other comparable peacetime period since World War II.

What improvements in U.S. military capability have been realized during this period? Claims by the Administration that significant improvements have resulted from the expansion of defense budget authority are challenged by some critics, who focus instead on instances of excessive pricing, inflated contractor overhead, or other wasteful practices. In an effort to provide a reasonable and objective basis for discussion of this issue, CBO has compiled selected measures of factors that contribute to military capability. These factors include the size of U.S. forces (force structure), the quality of equipment (modernization), the extent to which forces are ready for immediate combat (readiness), and the material resources necessary to continue to fight effectively to a successful resolution of a conflict (sustainability).

These measures are subject to important limitations. None provide a direct, comprehensive measure of U.S. military capability or that of its potential adversaries. Most ignore any quality increase in the new generation of weapons. And some--especially the size of U.S. forces--cannot be compared directly with changes in budgets because the measure represents a stock of equipment that changes only gradually over time as budgets increase. Despite these limitations, these measures are a reasonable set of indicators commonly used by the Department of Defense (DoD).

These measures suggest there have been improvements in all aspects of U.S. military capability since 1980, with the degree of improvement often reflecting the priority accorded by the Administration.

- Except for Navy ships, increases in the number of U.S. forces have been relatively modest through 1985. Equipment funded but not yet delivered will permit some further force expansion over the next five years. But expansion will in most cases still be modest, reflecting the lower priority the Administration has placed on force expansion.

- Purchases of new, modern equipment continued at a high level, but the number of weapons purchased in 1982-1985 was not always significantly greater, despite much higher procurement funding, than the number purchased in 1977-1980. This reflects changes in the mix of weapons--weapons of greater sophistication and higher cost were often purchased instead of cheaper ones--and unanticipated growth in unit costs of weapons since 1980.

- There has been a marked improvement in the quality of personnel entering the services (especially the Army) and an increase in retention of experienced personnel. Improved personnel readiness--the Administration's highest priority--no doubt means that U.S. forces are more combat ready today than five years ago. Other aggregate measures of readiness, however--such as the extent of training time and the maintenance of equipment--show more modest gains.

- Resources necessary to sustain combat have increased. War reserve stocks of munitions (including ammunition, bombs, and missiles) have been increased significantly by all the services. Stocks of other items (spare parts, food, fuel, medical supplies) necessary to sustain combat also have increased, though service requirements for the latter have grown even faster than have stocks.

Despite widespread improvements, most of these aggregate indicators have not increased markedly, with a few exceptions like personnel quality. Yet there has been a sizable increase in the defense budget. The lack of marked improvements may reflect the aggregated nature of the measures used here, which may mask some changes, and the gradual change one would expect in stocks of defense equipment. Nor do the measures used here necessarily reflect improvements in weapons quality that have been a high priority in this Administration. Because of these limitations and others stated earlier, it is beyond the scope of this analysis to ascertain whether the defense buildup has been worth its cost.

The analysis does point up the difficulty in quantifying what has been accomplished by the higher level of defense budget authority. This is particularly true for factors such as the quality of weapons, training and equipment readiness, and requirements for sustainability in wartime. Clearly no single measure, or even a group of measures, will fully capture the effects of increased funding. Particularly in the difficult areas like weapons quality, readiness, and sustainability, it would be useful for the

DoD to identify new, output-oriented measures of capability, perhaps including some that systematically capture the judgments of experts about factors that resist quantification. These steps might facilitate attempts to assess future improvements in U.S. military capability.

## INTRODUCTION

During the first four years of this Administration (fiscal years 1982-1985), the Congress provided about $1,100 billion in budget authority for national defense. 1/ Even after adjustment for inflation, this amount is about 36 percent greater than was spent in the previous four years. Moreover, budget authority for national defense over this period grew at an average annual real rate of 8.6 percent, higher than during any other peacetime period since World War II.

What has been accomplished during this period of increased defense spending? The Administration argues that it has made substantial progress toward improving U.S. military capability. Critics, however, have questioned the extent to which the buildup has truly increased capability or whether much of the increased funding has resulted in excessive prices for defense products and waste in military operations.

In this paper, the Congressional Budget Office (CBO) has assembled a number of quantitative indicators that are related to military capability. These measures are compiled by the Department of Defense (DoD) and have been cited by DoD officials as indicators of improved capability. 2/ These measures fall into four categories:

- Force structure--number of combat units
- Modernization--newer, more sophisticated equipment to defeat the enemy threat
- Readiness--how ready U.S. forces are to deploy and fight in the early stages of a conflict
- Sustainability--how well they can sustain prolonged combat to successful resolution.

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1. This figure, and all others in this paper except where noted, are in constant 1985 dollars. Also, all references to years refer to fiscal rather than calendar years.

2. See especially Department of Defense, Improvements in U.S. Warfighting Capability: FY 1980-84 (May 1984).

The Administration sometimes refers to these factors as the four "pillars" of military capability.

In most cases, the analysis compares data from 1980--the year before the current Administration had any input to the defense budget--with data for 1985 (or for 1984 if reliable projections for 1985 are not available). To keep the analysis manageable, and also to rely solely on unclassified sources, the analysis presents only aggregated results.

## LIMITATIONS OF THE ANALYSIS

This review does have some important limitations. CBO has not included any discussion of changes in the threats to U.S. security, which of course influence the net impact of the improvement in U.S. military capability. In addition, many factors that contribute to capability, such as troop morale and national military strategy, cannot be quantified.

The measures used in this paper also have some important limitations. Principally, they do not measure military capability directly and comprehensively. A direct, comprehensive measure would address how well U.S. forces deter armed conflict, since this is a key policy goal, or even how effective U.S. forces were in assisting the United States to achieve all its national security objectives. Alternatively, such a measure might at least quantify the ability of U.S. forces, together with those of its allies, to prevail in a future conflict, since a high probability of winning may well deter a war. No such direct, comprehensive measures currently exist for U.S. forces as a whole. 3/ Instead, the measures presented here show improvements in various factors that are generally accepted as relevant to military capability.

These measures suffer from other limitations as well. Simple counts of weapons systems (tanks, aircraft, and so forth) do not reflect improvements in quality or sophistication which the new weapons incorporate. Although some of these measures reflect quality improvements in a limited

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3. The services have models that quantify the capabilities of individual units (battalions, squadrons, ships), and they also attempt to aggregate results across theaters of combat and across mission areas. Particularly for the aggregate results, however, there are so many highly uncertain assumptions that the results are subject to much debate.

way (see Modernization, below), for most measures the quality dimension is neglected.

Nor can changes in some of the measures be related directly to change in budget dollars. Annual budget authority represents a flow of resources that only gradually affects measures--such as numbers of forces--that represent a stock of assets. (This stock-flow problem is discussed more fully in the section on Historical Trends, below.) Some of the measures, particularly those relating to personnel, may also be affected by the state of the economy and public attitudes toward the military--factors that have little to do with defense budget authority.

Despite these important limitations, these measures are commonly used by the Department of Defense. Subsequent sections in this paper review each of the four factors in turn.

## HISTORICAL TRENDS IN DEFENSE SPENDING

As background, this section summarizes trends in Department of Defense budget authority that may have improved the measures.

### Trends in Total Budget Authority for National Defense

Between 1955 and 1975, national defense budget authority--after adjustment for inflation--was relatively stable, if one excludes the costs of the Vietnam War (see Figure 1). Measured in 1985 dollars, real national defense budget authority rose from $171 billion in 1955 to $216 billion in 1963. Vietnam-related spending swelled the total to $255 billion by 1968. But with the phase-out of U.S. involvement in Vietnam, real budget authority declined until, by 1975, it was reduced to $174 billion, comparable to the 1955 level of spending.

At this time, strong bipartisan sentiment developed that an increase in national defense spending was necessary to meet the threat represented by growing Soviet military capability. Over 1976-1980, the Congress increased annual real budget authority by a total of 12 percent. The Reagan Administration greatly accelerated the buildup. Between 1980 and 1985, national defense budget authority was increased in real terms by 51 percent, an average rate of 8.6 percent per year. By 1985, total budget authority stood at $293 billion, a peacetime record.

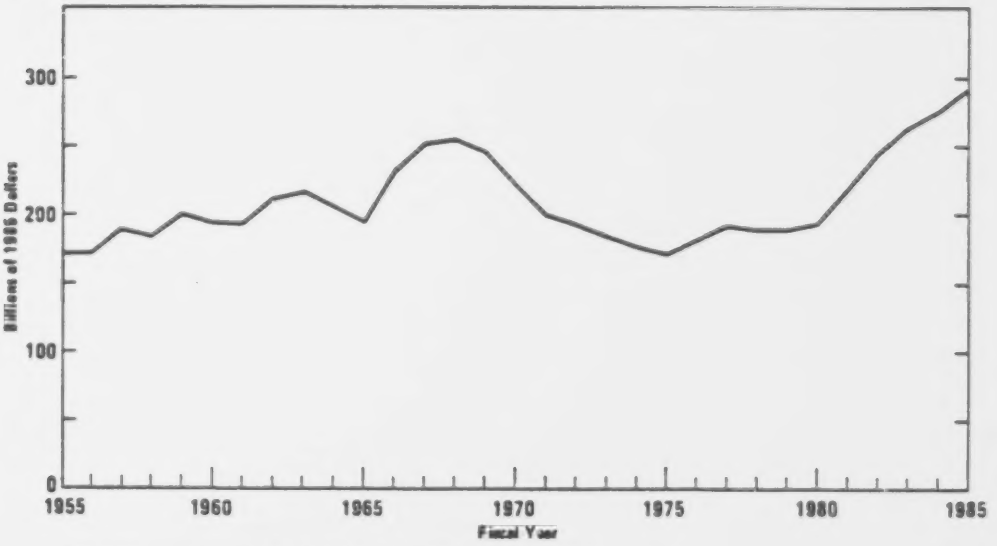
## Trends in Defense Spending As a Share of GNP

While real budget authority provides a good measure of the resources available to DoD, defense outlays as a percentage of the gross national product (GNP) are the most commonly used measure of the burden defense spending places on the economy. These percentages show a different picture than do the trends in real budget authority.

In the peacetime year of 1955, national defense outlays accounted for over 11 percent of the GNP (see Figure A-1 in Appendix A for details). During the 1950s and early 1960s, the share of GNP for defense steadily declined. By 1965, it was 7 percent. While Vietnam spending temporarily raised the share, the decline resumed in 1968. By 1976, defense spending consumed 5.5 percent of GNP, half the 1955 percentage.

The recent expansion reversed the downward trend and has raised the cost of defense to 6.5 percent, comparable to the 1965 percentage. Thus, defense spending has been rising as a percentage of GNP, but not to historical highs for peacetime. Moreover, in part because defense is still a relatively small share of total GNP, the U.S. economy has to date

Figure 1.
Defense Budget Authority




SOURCE: Congressional Budget Office from Department of Defense data.

accommodated the defense expansion without experiencing increases in general inflation or shortages in labor or materials. 4/

Shifts in the Composition of DoD Spending Since 1980

Not all categories of defense budget authority increased equally during the buildup. From 1980 to 1985, investment funding, after adjustment for inflation, rose from $69.7 billion to $133.8 billion, an increase of 92 percent (see Table 1). The investment-related funds in the DoD budget include the procurement, research and development, and military construction appropriations. The largest share of this funding was for procurement of equipment ($96.8 billion in 1985), but $31.5 billion was also provided in 1985 for research and development. Building new military facilities cost $5.5 billion in 1985.

Assessments of the impact of increases in national defense budget authority should distinguish between increases in investment in defense capital goods and increases in the stock of defense goods. The U.S. military owns a large stock of long-lived capital assets (ships, aircraft, vehicles, and base facilities) whose total value in today's prices approaches $800 billion. 5/ New equipment and structures purchased through these funds add to the total stock of equipment available to the military. At the same time, losses of equipment occur each year because of accidents, retirement of equipment that is too old to maintain economically, or obsolescence in the face of improved enemy capabilities. Thus, a certain amount of investment is required simply to stay even. 6/

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4. For further discussion, see Congressional Budget Office, Defense Spending and the Economy, February 1983.

5. The Bureau of Economic Analysis (BEA) estimates that (in 1984 dollars) the value of DoD equipment was $616.6 billion and the value of DoD structures $170.3 billion as of December 1984.

6. The Bureau of Economic Analysis estimates that, in 1984, retirements totaled $36 billion, or about 5 percent of the defense capital stock. This $36 billion figure approximates the cost today to replace the equipment leaving the DoD inventory with identical new items of identical capability. It is not an estimate of the cost of replacing this equipment with the more modern and capable equipment actually being purchased, which is considerably higher. The BEA estimate also depends on many simplifying assumptions.

If investment funding is provided in excess of the cost of retirements, the capital stock will increase. A doubling of investment funding, however, will not immediately double the capital stock; the resulting percentage increase in the stock would be much less than the percentage increase in

TABLE 1. DEPARTMENT OF DEFENSE BUDGET AUTHORITY IN 1980 AND 1985
(In billions of 1985 dollars)

| | 1980 | 1985 | Percent Change |
|---|---|---|---|
| Investment | (69.7) | (133.8) | (92) |
| Procurement | 48.8 | 96.8 | 98 |
| Research, development, test and evaluation | 17.9 | 31.5 | 76 |
| Military construction | 2.9 | 5.5 | 87 |
| Military Pay | (61.5) | (68.9) | (12) |
| Military personnel | 45.9 | 68.9 | N/A |
| Retired pay | 15.5 | N/A a/ | N/A |
| Operation and Other Support | (61.1) | (82.0) | (34) |
| Operation and maintenance | 58.3 | 78.2 | 34 |
| Family housing | 2.0 | 2.9 | 47 |
| Revolving funds and miscellaneous | 0.8 | 0.9 | 13 |
| Total DoD Budget Authority | 192.2 b/ | 284.7 b/ | 48 |

SOURCE: Congressional Budget Office.

NOTE: N/A = Not applicable.

a. Shift to accrual accounting for retired pay.

b. Detail does not add to total because of rounding.

funding. As an example, if the average life of DoD assets were 20 years, so that investment representing 5 percent of the stock was required per year just to replace existing assets, total investment funding equal to 8 percent of the stock would lead to an increase in the stock of 3 percent. A 100 percent increase in investment funding (to a level equal to 16 percent of the stock) would still result in an increase of only 11 percent in the value of the capital stock.

In contrast, real increases in operational and support funds should result in more immediate and more roughly proportionate increases in the activities they support. These funds include the military personnel appropriation that provides pay and certain support costs for uniformed personnel, the operation and maintenance appropriation that pays for all force operations and the maintenance of capital equipment and structures (including the pay of civilian employees of the Department of Defense), and the family housing appropriation that supports the cost of housing military families. 7/

## Operation and Support Increases

Percentage increases in operation and support costs between 1980 and 1985 were considerably smaller than those for investment. Increases in personnel costs were the smallest of all according to standard national accounting conventions, which treat all government employee wage increases as cost increases and so deflate by the size of the pay increase. Real military personnel funding rose from $61.5 billion in 1980 to $68.9 billion in 1985, an increase of 12 percent (see Table 1). A better way to appraise the real increases in personnel funding is to compare the rate of increase of military pay with that of average hourly earnings of production workers in the private economy, since DoD must compete with the private sector for personnel. Military pay rose by 44 percent from 1980 to 1985, while the index of private-sector hourly earnings of nonagricultural workers increased by 37 percent over the same period. 8/ Adjusted by average hourly earnings, military personnel funding rose from $59.1 billion (1985 dollars) in 1980 to $68.9 billion in 1985, an increase of 17 percent.

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7. Actually, about one-third of the family housing appropriation is for investment, and two-thirds for operation and maintenance. Since the dollar magnitudes are relatively small, CBO has ignored this distinction in the statistical analysis that follows.

8. Neil Singer, "Pay Comparability Analysis," Staff Working Paper, Congressional Budget Office (April 1985).

The other major part of operation and support funding--that for operation and maintenance--rose from $58.3 billion in 1980 to $78.2 billion in 1985, an increase of 34 percent. This increase should result in an increase in force operations, training activities, base support, maintenance of the increased capital stock, and other essential activities.

The rapid rise in investment means that, in 1985, budget authority for investment will comprise 47 percent of the total DoD budget. This is a post-World War II high for the investment share, though it was at nearly the same level in the early 1960s (see Table A-1 in Appendix A).

Some analysts and policymakers have expressed concern that this ratio is unacceptably high and that, as a consequence, operation and maintenance and other supporting appropriations are underfunded. 9/ This conclusion cannot be reached solely from the ratios, however, since funding for operating accounts has also risen sharply in real terms. Indeed, as was noted above, one would expect investment's share of the total budget to rise during periods of increasing military spending, if equipment stocks are to be increased.

After adjustment for inflation, the recent buildup has left defense budget authority higher than it has ever been in peacetime. Moreover, the 1980-1985 increase is the first major defense buildup since World War II not associated with a conflict. As a percentage of gross national product, however, defense spending is still considerably less than it was in the peacetime period of the 1950s.

## FORCE EXPANSION

What has been accomplished during this marked buildup of defense budget authority? The first of the four indicators often used by DoD to assess military capability is the number of U.S. combat units, commonly termed "force structure." With the exception of Navy ships, there has been only a modest expansion in force structure between 1980 and 1985, though there will be some further expansion as weapons already funded are completed and

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9. See the discussion in Honorable Les Aspin, "The Mayaguez Stumper or: How to Figure What's Enough for Military Readiness," U.S. House of Representatives (April 1984).

are available to equip additional forces. This modest expansion may not be surprising, since the Administration has accorded lower priority to force structure improvements than to the other three "pillars"--readiness, sustainability, and modernization--owing to overall resource limits. 10/

## Uniformed Personnel

One measure of force structure is the number of personnel in uniform. Between 1980 and 1985, the total number of military personnel (in both active and reserve units) increased by 317,000 (see Table 2). But most of this increase was in the National Guard and Reserve, which had serious personnel deficiencies in 1980. These part-time military personnel increased by 216,000 or 25 percent. The number of full-time, active-duty personnel increased by 112,000 or only about 5 percent. Clearly, the emphasis in this buildup was not on increasing active-duty personnel.

## Strategic Forces

Another way to evaluate force size is to count the number of key weapons systems. For strategic nuclear systems, the number of sea-launched ballistic missiles will increase from 576 in 1980 to 640 in 1985, an increase of 11 percent (see Table 2). But this growth only balances the decrease in operational bombers and land-based intercontinental ballistic missiles. (B-1 bombers and MX missiles already purchased are not included in these increases, since they will not become operational until 1986 or later.)

## Conventional Forces

Conventional forces are typically measured in the number of units such as divisions, aircraft squadrons, or ships. Navy ships display the largest increase in the number of forces. By September 1985, Navy "battle-force" ships will have increased from 479 ships in 1980 to 542 ships, an increase of 13 percent. (Battle-force ships are those that would participate in or directly support combat operations.) Ships purchased with funds authorized

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10. Department of Defense, Improvements in U.S. Warfighting Capability, p. 3.

before 1981 account for most of this growth. Only a dozen of the 65 ships authorized after 1980 will be completed and in the force structure inventory by the end of 1985.

The Army added one division in the active forces (6 percent) and one in the National Guard (12 percent). (An active Army division typically consists of 16,000 to 18,000 uniformed personnel plus associated equipment

TABLE 2. U.S. FORCE STRUCTURE

| | 1980 | 1985 |
|---|---|---|
| Uniformed Personnel (thousands) | 2,040/(861) a/ | 2,152/(1,077) |
| Strategic Forces | | |
| Ballistic missiles (land) | 1,052 | 1,023 |
| Ballistic missiles (submarine) | 576 | 640 |
| Bombers | 376 | 298 |
| Interceptor squadrons | 7/(10) | 5/(11) |
| Conventional Forces | | |
| Land forces | | |
| Army divisions | 16/(8) | 17/(9) |
| Marine divisions | 3/(1) | 3/(1) |
| Tactical air forces | | |
| Air Force squadrons | 79/(39) | 78/(43) |
| Navy/Marine Corps squadrons | 85/(17) | 88/(17) |
| Ships | | |
| Deployable battle forces | 479 | 542 |
| Reserves and auxiliaries | 59 | 63 |
| National Defense Reserve Fleet | 164 | 214 |

SOURCE: Congressional Budget Office from Department of Defense data.

a. Active/(Reserve).

and support personnel.) The total number of personnel in the active Army, however, has not increased, though recruit quality has improved (see Readiness, below). Instead, the additional active division was created by reorganizing existing units; in particular, the new "light" divisions will be smaller and have less heavy equipment (like tanks) than current Army divisions.

The number of tactical fighter squadrons has increased by three in the active Navy (4 percent) while decreasing by one in the Air Force. Additional reserve squadrons also have been created. (Fighter squadrons vary widely in content and mission. A typical Air Force squadron might have 24 aircraft plus associated backups; Navy squadrons vary in size.)

## Further Force Expansion

In one sense, the measure used in the above comparisons--force structure in 1985--is the valid indicator, since the forces available today would have to fight if a war occurred with little warning. On the other hand, money spent over the last few years has bought weapons that will enter the inventory in the future. Thus, force structure in 1985 understates improvements already funded.

In the Navy, for example, it is likely that ships funded to date will propel the Navy to higher force levels, assuming retirement of older ships at ages typical of those in the recent past. By the end of this decade, Navy battle forces should number about 600, a 25 percent increase over 1980 levels. Also, about 52 B-1 bombers had been purchased through 1985; these should be in service in a couple of years. Trends for tactical fighters are less clear. Both the Navy and Air Force plan to expand the number of squadrons but, in the absence of changes in plans to retire older aircraft, aircraft funded through 1985 will probably not generate substantial expansion even when they enter service. 11/

Indeed, the buildup to date--large as it has been--has not met some of the services' program goals for expanding U.S. military forces. The Army

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11. For further discussion, see Congressional Budget Office, "Preliminary Analysis of the Department of the Navy's Plans for Combat Air Forces," Staff Working Paper, March 4, 1985; and Congressional Budget Office, "Preliminary Analysis of Tactical Combat Forces in the Air Force," Staff Working Paper, May 22, 1984.

intends to add another active-duty division though, again, it plans to do so without expanding the number of uniformed personnel. The Navy and Air Force both plan to increase the number of tactical air squadrons and are asking for additional personnel to man them.

In sum, even when all weapons purchased by 1985 are in the inventory, percentage increases in Navy forces will amount to 25 percent while increases for other forces will be much smaller. These increases cannot be compared directly with changes in funding, since forces represent a stock of assets that changes only gradually as funding is increased. But it is clear that, in keeping with the Administration's position, expansion in the number of forces has been limited to fund program goals of higher priority.

## MODERNIZATION

Given that only the Navy has programmed significant force expansion, what explains the sizable procurement programs of the other services? The answer to this question is modernization, the second factor related to military capability. The demands of modern warfare suggest that the side with superior equipment can overcome significant quantitative inferiority through its advantage in quality. Thus, force modernization has been a high priority for the services and DoD, as well as the Congress. 12/ (For the Army, new equipment serves both to augment capability and to fill out long-standing equipment deficits in both active and reserve units.)

The Congress has authorized the purchase of many new weapons. In 1982-1985, for example, the services received authority to purchase over 2,800 aircraft, including 1,482 combat aircraft (see Table 3). In addition, the services bought over 124,000 missiles. The Navy bought 83 ships, including 29 major warships. And the Army bought over 10,000 tanks and other combat vehicles. Many of these were highly sophisticated weapons such as 3,235 M1 tanks, 2,455 Bradley fighting vehicles, 52 B-1B bombers, 42 MX missiles, and 687 F-15 and F-16 fighter aircraft. Despite these substantial purchases, some major procurement programs are still well short of their total acquisition objectives (see Appendix B).

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12. Joint Chiefs of Staff, U.S. Military Posture for Fiscal Year 1983, p. 63.

TABLE 3. TOTAL QUANTITIES AND COSTS OF MAJOR WEAPONS SYSTEMS PROCURED
(In units and constant dollar budget authority)

| | Total 1977-1980 | Total 1982-1985 | Percentage Change |
|---|---|---|---|
| Aircraft, Fixed Wing | | | |
| Combat | 1,745 | 1,482 | -15.1 |
| Airlift | 144 | 165 | 14.6 |
| Trainer | 113 | 114 | 0.9 |
| Aircraft, Rotary | 587 | 1,055 | 79.7 |
| Total Aircraft | 2,589 | 2,816 | 8.8 |
| Total Cost in Billions of 1985 Dollars | 43.3 | 75.9 | 75.4 |
| Missiles, Strategic and Theater Nuclear | 627 | 2,284 | 264.3 |
| Missiles, Tactical | | | |
| Air launched | 19,999 | 42,047 | 110.2 |
| Surface launched | 96,082 | 79,860 | -16.9 |
| Total Missiles | 116,708 | 124,191 | 6.4 |
| Total Cost in Billions of 1985 Dollars | 15.0 | 28.7 | 91.2 |
| Ships, Trident Submarines | 4 | 3 | -25.0 |
| Major Warships a/ | 15 | 29 | 93.3 |
| Other Warships | 29 | 22 | -24.1 |
| Ships, Auxiliaries | 13 | 29 | 123.1 |
| Total Ships | 61 | 83 | 36.1 |
| Total Cost in Billions of 1985 Dollars | 28.9 | 44.2 | 53.0 |
| Tanks and Combat Vehicles | | | |
| Tanks | 2,762 | 3,235 | 17.1 |
| All other vehicles b/ | 5,194 | 7,107 | 36.8 |
| Total Quantity | 7,956 | 10,342 | 30.0 |
| Total Cost in Billions of 1985 Dollars | 6.2 | 15.3 | 147.4 |

SOURCE: Department of Defense procurement summaries (P-1) for fiscal years 1977-1984, and Congressional Conference Report (HR 98-1159) for fiscal year 1985. Excludes all classified programs. Compiled by the Congressional Budget Office Defense Cost Unit.

a. Excludes service life extension programs (SLEP) and conversions except for the battleship reactivation program.

b. Includes Marine Corps tanks, vehicles, and LVT7A1 SLEP.

## Factors in Modernization

Providing some perspective on these large numbers requires a comparison of budget authority with weapons bought. Table 3 compares budget authority and weapons purchased in 1982-1985 with comparable figures for 1977-1980. 13/ The data suggest that in the more recent period, emphasis was not placed on buying larger numbers of weapons. Comparing the two periods, the United States did buy 36 percent more ships and 30 percent more tanks and combat vehicles. But budget authority for these weapons increased by 53 percent and 147 percent, respectively. The lack of emphasis on numbers is even more clear for aircraft and missiles. The number of missiles purchased increased by only 6 percent despite a budget authority increase of 91 percent. Aircraft purchases went up less than 9 percent versus budget authority growth of 75 percent. Indeed, purchases of combat aircraft were lower in the more recent period than during 1977-1980.

Some of these results stem from shifts in the types of weapons approved for purchase. For example, while the number of airlift aircraft procured was about the same in 1982-1985 as in 1977-1980, in the more recent period the Air Force was buying C-5B and KC-10 aircraft to remedy a shortage of intercontinental airlift capacity. In the earlier period, airlift purchases were dominated by the much smaller and shorter-ranged C-130 transport. Similarly, the Army stopped buying Dragon surface-to-surface missiles (at about $13,000 apiece) and began buying the considerably more advanced Hellfire missiles (at about $38,000 apiece). The Navy purchased many more large surface combatants in the latter period, but reduced its purchases of frigates. (CBO will supply upon request a more detailed tabulation of purchases of individual weapons by fiscal year.) Thus, the small percentage increases in numbers, as compared with increases in cost, must be viewed in light of the choice to purchase different weapons that are more costly but also likely to be more capable.

A significant share of the increase in procurement funding authorized since 1980 also went to fund unanticipated higher prices, not increased quantities or quality of equipment. DoD's original plan for 1981-1985 anticipated that prices would decline over time as cumulative production

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13. Because of the transition at the end of 1976 to a fiscal year beginning on October 1, a comparison of 1976-1980 with 1981-1985 could be misleading. Therefore, this paper compares four-year periods and omits 1981.

increased. Actual costs per unit for certain major weapons were higher than expected by percentages varying from 9 percent to 64 percent during the 1981-1985 period, even after adjustment for overall inflation experienced by all DoD weapons (see Table 4 and, for more detail, Tables A-2 and A-3 in Appendix A). 14/ These higher costs were recognized in the 1983 budget submission; since then, costs per unit have remained stable for most systems. Nonetheless, over the entire period 1981-1985, unanticipated cost increases did consume a substantial part of the growth in procurement funding.

## READINESS

The analysis so far has examined increases in the number of forces and DoD's efforts to provide them with modern equipment. National security requires that those forces also be ready to perform their missions when necessary. Forces are deemed ready if they are trained and equipped to perform their wartime missions. Readiness measures, then, look at two aspects--personnel and materiel. Within each aspect, both quantity and quality are important.

### Personnel Readiness

One important aspect of readiness is the quality and experience of DoD personnel. Of all the aspects of defense capability discussed in this paper, this area has shown the most dramatic improvement.

Recruit quality is best assessed by looking at the Army, which faces the greatest recruiting challenge. In 1980, one out of two Army recruits

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14. Because of the method used in this paper, the average cost per unit identified here differs from the unit costs reported in the Selected Acquisition Report (SAR). The latter is computed on the basis of the total acquisition cost for a program and not on costs in a given fiscal year or group of years. The estimates of unit costs in this paper are designed to show how cost growth affects the services' ability to buy weapons. Thus the method compares what the services planned to spend over a period of years to what they actually spent, adjusting for the fact that actual inflation proved to be lower than anticipated rates of inflation included in the plan's figures. (Appendix C details the method of adjustment.)

TABLE 4. PERCENTAGE CHANGES IN ACTUAL VERSUS PLANNED COSTS PER UNIT FOR SELECTED MAJOR WEAPONS

| | 1981-1985 a/ | 1983-1985 b/ |
|---|---|---|
| M1 Tank | 45 | -8 |
| M2/3 Fighting Vehicle | 64 | -1 |
| AH-64 Attack Helicopter | 36 | -18 |
| CG-47 Cruiser | 10 | -9 |
| Trident Submarine | 9 | 5 |
| F/A-18 Fighter/Attack Aircraft | 58 | 2 |
| F-15 Fighter Aircraft | 23 | 25 |
| F-16 Fighter Aircraft | 24 | -3 |
| DDG-51 Destroyer | c/ | -24 |
| B-1 Bomber | c/ | -9 |
| C-5B Transport Aircraft | c/ | 25 |
| MX Missile | c/ | 74 d/ |

SOURCE: Congressional Budget Office from Department of Defense data presented in support of the DoD budget requests for fiscal years 1981, 1983, and 1985.

a. Percentages reflect unanticipated growth in actual cost per unit (adjusted to 1985 dollars) versus planned costs per unit in the fiscal year 1981 budget.

b. Percentages reflect growth or decline in actual cost per unit (adjusted to 1985 dollars) versus planned costs per unit in the fiscal year 1983 budget.

c. New programs not included in fiscal year 1981 budget plan.

d. In some cases, such as the MX missile, the increase in unit cost was associated with significant reductions in the rate of production, and was thus predictable. In other cases, such as the F-16, improvements in the weapon provide a partial explanation for the increase in costs.

was drawn from Category IV, the lowest acceptable test score group among those taking the Armed Forces Qualification Test. In 1984, only 10 percent of enlistees scored in Category IV; this was the Army's goal and was well below Congressionally imposed maximums (20 percent) and draft-era averages (also about 20 percent). Moreover, in 1984 nine out of ten Army recruits were high school graduates, again far exceeding the Congressional minimum (65 percent) and draft-era averages (70 percent to 75 percent).

The experience level in the services is also rising as a result of an increase in reenlistment rates. In 1984, over 50 percent of eligible enlisted personnel reenlisted after their first term (usually the first three or four years of service) and 80 percent after their second or successive term of service. These values are much higher than 1980 levels when 39 percent of first-term personnel and 71 percent of career personnel reenlisted. As a result of these high reenlistment rates, the size of the career forces (defined as those with more than four years' service) are much larger. In 1980, career enlisted personnel numbered about 736,000, about 42 percent of all active-duty enlisted personnel. By 1984, career enlisted personnel numbered 877,000, accounting for 48 percent of all active-duty enlisted personnel.

The 1981-1982 recession certainly helped improve recruiting and retention in all the services. The high levels of unemployment that influenced personnel to join and remain in the military have since declined somewhat; yet recruiting and retention rates, while falling off slightly from the high levels of 1983, remain good by historical standards. Rather than simply reflecting a poor civilian job market, these improvements reflect the substantial increases in pay granted in 1980 and 1981 as well as important changes in personnel policies aimed at improving recruiting and retention.

## Training Readiness

In addition to personnel quality and experience, training also influences readiness. Training readiness indicates whether troops have received adequate instruction and practice to perform their assigned missions and to maintain proficiency in those tasks. No objective measure exists for training readiness; unit ratings are based on the commander's judgment. A quantitative analysis such as CBO's can only measure training activity.

There have been only spotty increases in various measures of training activity between 1980 and 1984. For example, Army battalion training days

are unchanged; Air Force flight crew monthly flying hours are up by 6 percent overall, but Navy flying hours are down slightly; Navy steaming days increased only 5 percent for deployed fleets and not at all for nondeployed fleets. (Table A-4 in Appendix A shows details.)

Nor are the services training more people in formal schools. Individual training loads (the man-years spent in formal schools) have not increased since 1980 (see Table A-4). Yet during this period, funds for training were increased by about 24 percent after adjustment for inflation. 15/

Some of the additional funds were used to improve the quality of training. The Army, for example, is sending more units to its expensive but realistic National Training Center in California. The center is the facility best equipped to simulate combat conditions. The Air Force and Navy are conducting more realistic, and perhaps more expensive, training of their pilots. Use of simulators has certainly increased, but no overall measure of this type of activity is available. These qualitative improvements may explain some or all of the cost increases in training.

### Equipment on Hand

Equipment and supplies on hand is a measure of the extent to which units have been provided the necessary equipment to perform their missions. Specific data on equipment on hand are classified. 16/ The Department of Defense, however, has reported publicly that equipment and supplies on hand have increased for the Navy and for Marine Corps aviation units, remained stable for Marine Corps land forces, and declined for the Army and Air Force. 17/ Many of these declines are attributed to changes in the standards used to assess this dimension of readiness. 18/ For example, as an

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15. Department of Defense, Military Manpower Training Report, fiscal years 1982 and 1984; and Department of Defense, Force Readiness Report, vol. 4, Military Manpower Training Report, fiscal years 1985 and 1986.

16. See the classified appendix to Department of Defense, Improvements in U.S. Warfighting Capability.

17. Ibid., p. 8.

18. Ibid., pp. 101-116.

Army unit begins to receive the new M1 tank, its equipment requirements are immediately revised to reflect the parts and supplies needed to support the new equipment. Thus its rating for equipment on hand may fall until all the M1 tanks and associated support items have been received.

## Equipment Readiness

Equipment readiness can be measured at least in part by the percentage of equipment that is "mission capable." For aircraft, mission capable means that the aircraft can fly and perform at least one of its assigned missions. The measure has analogous meanings for other weapons.

Overall, the Department of Defense has characterized mission capable rates between 1980 and 1984 as "steady or slightly increasing." 19/ In many cases, the rates are near the goals set by the services, but rates for some types of forces have shown greater improvement (see Table 5). This is especially true for some types of aircraft, which are harder and more expensive to maintain at high mission capable rates. For example, mission capable rates for fighter/attack aircraft have risen from 53 percent to 63 percent in the Navy and from 62 percent to 73 percent in the Air Force.

Moreover, while projections are not available, there may be some further improvements based on funds already appropriated. Mission capable rates depend in part on the availability of spare parts to fix equipment. After money is authorized for spare parts, it takes one to two years before the parts are actually available at operating bases. Thus, over the next several years, further improvements should occur based on money spent to date.

These measures suggest some improvements in equipment and training readiness. But these improvements are not dramatic, especially in light of the 34 percent increase in funding in the operation and maintenance account, which pays for many activities related to training and equipment readiness, large increases in funding for spare parts, and more experienced personnel. In general, the increased funding for readiness does not appear to have resulted in proportional improvements in readiness measures.

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19. Ibid., p. 7.

## SUSTAINABILITY

Sustainability, the fourth of DoD's indicators of capability, measures the ability to continue to fight effectively after the initial outbreak of hostilities. Two prime indicators of sustainability are the level of stockage of munitions and the level of other items for which war reserves are kept, compared with requirements set by the services.

TABLE 5. MISSION CAPABLE RATES FOR EQUIPMENT

| | Percentage Mission Capable | | |
|---|---|---|---|
| | 1980 | 1984 | Goal |
| Army (Fully mission capable) | | | |
| Aircraft | 66 | 71 | 75 |
| Artillery | 88 | 89 | 90 |
| Missiles | 91 | 94 | 90 |
| Tanks | 86 | 87 | 90 |
| Navy (Mission capable) a/ | | | |
| Fighter/attack aircraft | 53 | 63 | 68 |
| Total aircraft | 59 | 70 | 73 |
| Marine Corps (Land--fully mission capable) | | | |
| Artillery | 88 | 89 | 85 |
| Missiles | 94 | 86 | 85 |
| Tanks | 86 | 87 | 85 |
| Air Force (Mission capable) | | | |
| Fighter/attack aircraft | 62 | 73 | 74 |
| Total aircraft | 66 | 71 | 75 |

SOURCE: Testimony of Assistant Secretary of Defense Lawrence J. Korb before the Subcommittee on Preparedness, Senate Armed Services Committee (February 21, 1985).

a. Includes Marine Corps aircraft.

Requirements for war reserves of munitions are inevitably highly uncertain, because they are based on the assumed nature and length of future wars. CBO cannot verify the validity of these requirements. Nonetheless, the services' requirements presented here are the only available measures, and they permit a relative assessment of DoD's position in 1980 and today.

## Munitions

Munitions include bombs, ammunition of all types, and most tactical missiles. War reserve stocks of munitions provide replenishments for forces, once the basic issue they carry with them has been exhausted. The DoD has spent substantial sums on war reserves. In nominal dollars, funding between 1981 and 1985 totaled almost $46 billion (see Table 6). This funding has increased reserves of munitions significantly. The Army, for instance, has gone from 65 percent to 77 percent of its requirements. The other services also show improvements. (Each of the services measures its overall war reserve position in different ways; thus, interservice comparisons would be misleading.) Major gaps still exist, however, between what the services have and what they say they need.

## Secondary Items

Secondary items are the roughly 4 million items, other than weapons systems and munitions, that DoD buys. Of these, some 200,000 items have been deemed sufficiently important to warfighting ability that war reserve objectives have been set for them. These items include spare parts for weapons systems, clothing, food, fuel, and medical supplies. War reserve stocks are maintained both in potential combat theaters--such as Europe, the Pacific, and the Indian Ocean--and in the continental United States. As with munitions, service estimates of the requirements for secondary items have increased considerably over the past five years. Though highly uncertain, the service estimates used here are the only available systematic statement of requirements.

Expressed as a percentage of requirements, stocks of secondary items have actually deteriorated slightly since 1980 for all services except the Air Force. From 1980 to 1985, war reserve stocks increased in value by 106 percent, measured in nominal dollars, but objectives increased by 118 percent (Table 7). These increases in objectives do not result from changing assumptions regarding the scope or length of a future war. Rather,

TABLE 6. WAR RESERVE STOCKS OF MUNITIONS a/

| | Percent of Objective | | Funding 1981-1985 b/ (Millions of dollars) | Cost to Meet Objective (Millions of dollars) | Years to Meet Objective c/ |
|---|---|---|---|---|---|
| | 1980 | 1984 | | | |
| Army | 65 | 77 | 19,109 | 15,400 | 3 |
| Navy d/ | 12 | 22 | 12,082 | 25,400 | 7 |
| Marine Corps e/ | 32 | 44 | 2,764 | 3,800 | 5 |
| Air Force | 21 | 30 | 11,838 | 25,800 | 9 |
| Total | N/A | N/A | 45,793 | 70,400 | 6 |

SOURCES: Congressional Budget Office from data in Department of Defense, Improvements in War Fighting Capability, FY 1980-84 (May 1984), and testimony of DoD officials.

NOTE: N/A = not applicable.

a. Munitions include ammunition, bombs, and most tactical missiles (as well as spares for the latter).

b. Fiscal year 1985 request.

c. At fiscal year 1985 spending rates.

d. Includes Marine Corps air munitions.

e. Land forces only.

TABLE 7. WAR RESERVE STOCKS OF SECONDARY ITEMS
(Millions of dollars)

| | Army | Navy | Air Force | Marine Corps | Total |
|---|---|---|---|---|---|
| 1980 | | | | | |
| Assets | 2,600 | 450 | 1,300 | 95 | 4,445 |
| Objective | 6,000 | 930 | 4,100 | 160 | 11,190 |
| Percent fill | 43 | 48 | 32 | 60 | 40 |
| 1985 | | | | | |
| Assets | 3,181 | 732 | 5,035 | 192 | 9,140 |
| Objective | 13,286 | 1,944 | 8,761 | 455 | 24,446 |
| Percent fill | 24 | 38 | 57 | 42 | 37 |
| 1980-1985 Percent Changes | | | | | |
| Assets | 22 | 63 | 287 | 102 | 106 |
| Objective | 121 | 109 | 117 | 184 | 118 |

SOURCE: Congressional Budget Office from Department of Defense data.

NOTE: Secondary items include clothing, fuel, rations, spare parts, medical supplies, and others deemed by the services as critical to a war effort.

statements by DoD and the services suggest that increases stem from the advent of new weapons that require much more expensive spare parts, which increases the cost of sustaining them in combat. 20/ Indeed, this may be one of the less visible ways in which more complex weapons add to DoD costs. Moreover, new weapons systems sometimes need new items of accessory equipment (for instance, the new table of equipment and organization calls for M1 tank drivers to be equipped with goggles for night vision). Since many of these items are in their initial procurement cycle and are still being used to equip units, there has not been time (or money) to build up war reserves.

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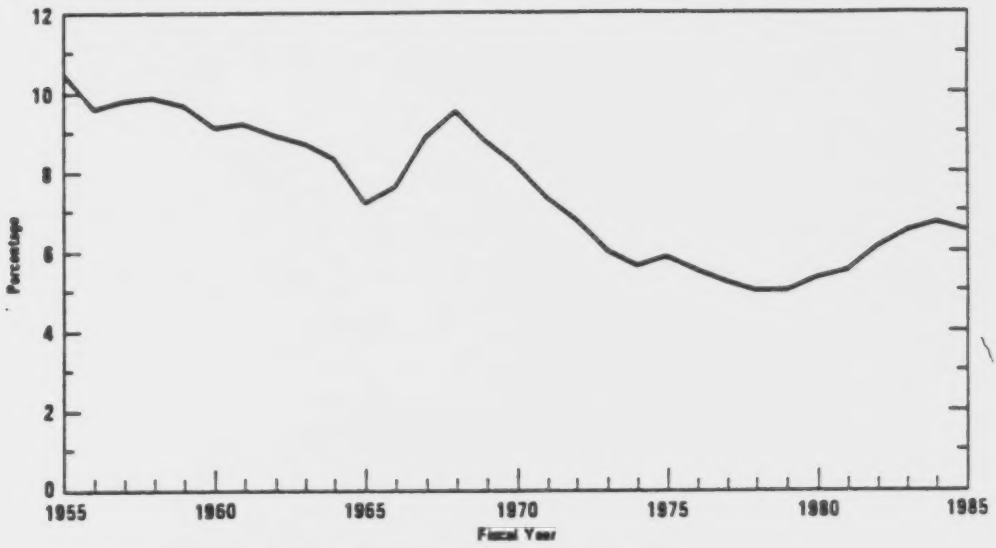
20. Ibid., p. 111.

# APPENDIX A. SUPPLEMENTARY FIGURES AND TABLES

Figure A-1.

## Defense Outlays as a Share of GNP




SOURCE: Congressional Budget Office from Department of Defense data.

TABLE A-1. HISTORICAL DISTRIBUTION OF DEFENSE SPENDING
(In percent)

| | 1955 | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 |
|---|---|---|---|---|---|---|---|
| Investment | 33 | 46 | 44 | 35 | 32 | 36 | 47 |
| Military Pay | 38 | 28 | 30 | 35 | 36 | 30 | 24 |
| Operation and Other Support | 30 | 26 | 27 | 30 | 32 | 34 | 29 |

SOURCE: Congressional Budget Office from Department of Defense data.

NOTE: Investment = Appropriations for procurement; research, development, test, and evaluation; and military construction.

Military Pay = Appropriations for military personnel and retired pay.

Operation and Other Support = Appropriations for operation and maintenance, family housing, and revolving funds.

TABLE A-2. PROCUREMENT CHANGES SINCE THE FISCAL YEAR 1981 BUDGET SUBMISSION

| | Planned 1981-1985 Program (In fiscal year 1981 Budget) | | | Actual 1981-1985 Program | | | Percentage Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quantity (Units) | Funding (In millions of 1985 dollars) | Cost per Unit | Quantity (Units) | Funding (In millions of 1985 dollars) | Cost per Unit | Quantity | Funding | Cost per Unit |
| M1 Tank | 3,891 | 6,332 | 1.63 | 3,804 | 8,966 | 2.36 | -2 | 42 | 45 |
| M2/3 Fighting Vehicle | 3,720 | 3,591 | 0.97 | 2,855 | 4,522 | 1.58 | -23 | 26 | 64 |
| AH-64 Attack Helicopter | 284 | 2,615 | 9.21 | 315 | 3,955 | 12.56 | 11 | 51 | 36 |
| CG-47 AEGIS Cruiser | 16 | 16,210 | 1,013.15 | 14 | 15,656 | 1,118.26 | -13 | -3 | 10 |
| SSBN Trident Submarine | 6 | 9,445 | 1,574.20 | 4 | 6,876 | 1,718.88 | -33 | -27 | 9 |
| F/A-18 Fighter Aircraft | 656 | 13,692 | 20.87 | 375 | 12,387 | 33.03 | -43 | -10 | 58 |
| F-15 Fighter Aircraft | 90 | 2,764 | 30.71 | 195 | 7,379 | 37.84 | 117 | 167 | 23 |
| F-16 Fighter Aircraft | 660 | 8,717 | 13.21 | 714 | 11,713 | 16.41 | 8 | 34 | 24 |

SOURCE: Congressional Budget Office from Department of Defense budget justification data (various fiscal years).

TABLE A-3. PROCUREMENT UNIT COST CHANGES SINCE THE FISCAL YEAR 1983 BUDGET SUBMISSION

| | Planned 1983-1985 Program (In fiscal year 1983 Budget) | | | Actual 1983-1985 Program | | | Percentage Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quantity (Units) | Funding (In millions of 1985 dollars) | Cost per Unit | Quantity (Units) | Funding (In millions of 1985 dollars) | Cost per Unit | Quantity | Funding | Cost per Unit |
| M1 Tank | 2,936 | 6,969 | 2.37 | 2,535 | 5,556 | 2.19 | -14 | -20 | -8 |
| M2/3 Fighting Vehicle | 1,930 | 2,919 | 1.51 | 1,855 | 2,770 | 1.49 | -4 | -5 | -1 |
| AH-64 Attack Helicopter | 269 | 3,650 | 13.57 | 304 | 3,374 | 11.10 | 13 | -8 | -18 |
| CG-47 AEGIS Cruiser | 9 | 10,556 | 1,172.89 | 9 | 9,559 | 1,062.08 | 0 | -9 | -9 |
| SSBN Trident Submarine | 4 | 6,808 | 1,701.92 | 3 | 5,340 | 1,780.00 | -25 | -22 | 5 |
| F/A-18 Fighter Aircraft | 288 | 8,604 | 29.187 | 252 | 7,689 | 30.51 | -13 | -11 | 2 |
| F-15 Fighter Aircraft | 198 | 6,653 | 33.60 | 117 | 4,910 | 41.96 | -41 | -26 | 25 |
| F-16 Fighter Aircraft | 360 | 6,861 | 19.06 | 414 | 7,626 | 18.42 | 15 | 11 | -3 |
| **New Programs (not included in 1981-1985 Five-Year Defense Plan)** | | | | | | | | | |
| DDG-51 Destroyer | 1 | 1,486 | 1,486.00 | 1 | 1,129 | 1,129.00 | 0 | -24 | -24 |
| B-1 Bomber | 53 | 17,404 | 328.38 | 51 | 15,246 | 298.94 | -4 | -12 | -9 |
| C-5B Transport | 24 | 5,212 | 217.16 | 13 | 3,526 | 271.23 | -46 | -32 | 25 |
| MX Missile | 118 | 7,362 | 62.39 | 42 | 4,550 | 108.33 | -64 | -38 | 74 |

SOURCE: Congressional Budget Office from Department of Defense budget justification data (various fiscal years).

TABLE A-4. MEASURES OF MILITARY TRAINING ACTIVITY

| | 1980 | 1982 | 1984 |
|---|---|---|---|
| Individual Training loads (In thousands of man-years) | | | |
| Army | 78 | 76 | 70 |
| Navy | 58 | 64 | 64 |
| Marine Corps | 19 | 19 | 21 |
| Air Force | 42 | 44 | 41 |
| Reserve components | 28 | 38 | 32 |
| Total DoD | 236 | 241 | 228 |
| Training Funding (In billions of 1985 dollars) | 11.1 | 12.6 | 13.8 |
| Collective Unit Training | | | |
| Annual training days per battalion | | | |
| Army | N/A | 161.7 | 161.9 |
| Marine Corps | N/A | 95.2 | 100.5 |
| Flying hours per crew per month | | | |
| Army | 18.8 | 17.2 | 16.4 |
| Navy and Marine Corps | 24.2 | 23.7 | 23.7 |
| Air Force | 20.2 | 21.4 | 21.5 |
| Air Force tactical aircraft | 15.6 | N/A | 19.3 |
| Steaming days per quarter | | | |
| Deployed fleets | 57 | 58 | 60 |
| Nondeployed fleets | 29 | 29 | 28 |

SOURCE: Data for 1980 and 1982 from Department of Defense, Military Manpower Training Report, fiscal years 1982 and 1984. Data for 1984 from Department of Defense, Force Readiness Report, vol. 4, Military Manpower Training Report, fiscal year 1986.

NOTE: N/A = not available.

## APPENDIX B. STATUS OF MODERNIZATION PROGRAM

Table B-1 shows the status of the acquisition programs for certain key weapons systems central to DoD's modernization efforts. The first column of the table shows the total acquisition objective for the system (that is, the ultimate number of weapons the service intends to buy). The second column shows the cumulative number authorized by the Congress through fiscal year 1985, and the third column expresses this as a percentage of the objective. Thus, the Army has, to date, been authorized to acquire 4,223 M1 tanks--60 percent of its total objective of 7,058.

The final column shows the percentage of all weapons in the appropriate class that are "modern." Since there is no single accepted definition of a modern weapon, CBO tailored the definitions used to fit each class of weapons system. The definitions used appear below:

- Tanks--M1 and M60A3 tanks as a percentage of all Army tanks.
- Fighting vehicles--M2 and M3 fighting vehicles as a percentage of all IFVs, CFVs, M-551s, and the family of vehicles derived from the M-113 APC.
- Attack helicopters--AH-64s as a percentage of all attack helicopters.
- Utility helicopters--UH-60s as a percentage of Army utility helicopters.
- Cruisers--ships less than 15 years old as a percentage of all cruisers.
- Landing ships--LHA-1 and LSD-41 class ships as a percentage of all landing ships.
- Strategic submarines--Trident as well as earlier class ships equipped with the C-4 Trident missile as a percentage of all strategic submarines. (Each Trident sub is counted as 1.5 ships to reflect the increase in missiles from 16 to 24.)

- Navy tactical aircraft--F-14s and F/A-18s as a percentage of all fighter and attack aircraft.
- Strategic bombers--B-1s as a percentage of all strategic bombers.
- Air Force tactical aircraft--F-15s and F-16s as a percentage of all fighter and attack aircraft.
- Strategic airlift aircraft--C-5s as a percentage of all strategic airlift aircraft (C-5s and C-141s).
- Tanker aircraft--KC-10s and re-engined KC-135s as a percentage of all tankers.
- Land-based strategic forces--MX missiles and Minuteman missiles equipped with the MK-12A warhead as a percentage of all land-based missiles.

TABLE B-1. ACQUISITION OBJECTIVES AND AUTHORIZATIONS FOR SELECTED SYSTEMS

| | Total Acquisition Objective | Authorized Through 1985 | | Percent Modern (As of 1985 FDP) a/ |
|---|---|---|---|---|
| | | Number | Percent of Objective | |
| Army | | | | |
| M1 tank | 7,058 | 4,223 | 60 | 67 |
| Bradley fighting vehicle | 6,882 | 2,955 | 43 | 10 |
| AH-64 helicopter | 515 | 315 | 61 | 23 |
| UH-60 helicopter | 1,107 | 689 | 62 | 19 |
| Navy/Marine Corps | | | | |
| AEGIS cruiser | 27 | 16 | 59 | 47 |
| LSD-41 | 8 | 6 | 75 | 18 |
| Trident submarine | (20) b/ | 12 | 60 | 56 |
| F-14 | 899 | 557 | 62 | 47 |
| F/A-18 | 1,377 | 409 | 30 | |
| Air Force | | | | |
| B-1 bomber | 100 | 52 | 52 | 14 |
| F-15 fighter | 1,356 | 834 | 62 | 45 |
| F-16 fighter | 2,651 | 1,139 | 43 | |
| C-5B transport | 50 | 13 | 26 | 25 |
| KC-10 tanker | 60 | 42 | 70 | 40 |
| MX missile | 100 | 42 | 42 | 52 |

SOURCE: Congressional Budget Office from Department of Defense data.

a. "FDP" refers to Funded Delivery Period, the time when all weapons authorized by 1985 are built and in the inventory.

b. Unofficial estimate of objective.

## APPENDIX C. PROGRAM COST CALCULATION

Appendix A presents estimates of unit cost for selected weapons systems included in the 1981-1985 DoD procurement program. These estimates were derived as follows:

1. Express planned funding (budget authority) in the 1981-1985 Five-Year Defense Plan in constant 1981 dollars by deflating, using the anticipated inflation factors used by DoD in 1980.

2. Inflate the sum over 1981-1985 to 1985 dollars using actual DoD inflation rates for major systems total obligational authority (TOA).

3. Divide the result by the planned acquisition quantity over 1981-1985 to derive planned unit cost (in 1985 dollars).

4. Inflate actual funding for the years 1981-1985 to 1985 dollars and sum.

5. Divide by actual quantity acquired to derive actual unit cost (again, in 1985 dollars).

The same procedure was used for the 1983-1985 comparison (with 1983 substituted for 1981 everywhere in the above description).